Name: _____

CHM 228 Exam 2 Fall 2018

Short Answer

1. Draw all possible isomers of [redacted]methylchlorobenzene.

2. Devise a synthesis of these compounds from benzene. Show all necessary reagents and reaction conditions.

p-nitrobenzoic acid

o-dibromobenzene

m-bromoaniline

p-di-n-propylbenzene

3. Benzene reacts with optically pure (R)-2-chlorobutane and $AlCl_3$. Is the product R? S? Racemic? Explain mechanistically.

4. When nitrobenzene is treated with Cl_2 and $AlCl_3$ the major product is 3-chloronitrobenzene. Show a complete mechanism for this reaction, including a detailed picture of any intermediates.

5. An unknown compound has the formula $C_6H_3Cl_3$. The proton NMR spectrum consists of one peak only. Deduce the structure of the unknown.

6. Based on what you know about the relative stability of alkyl cations and benzylic cations, predict the product of addition of HBr to 1-phenylpropene.

Draw a mechanism for this reaction.

7. Draw the structure of the product(s) for the following $AlCl_3$ catalyzed reactions;

benzene + chlorocyclohexane

3-chloro-2,2-dimethlbutane + isopropylbenzene

8. Why does phenol react 10,000 times faster than benzene ? Draw a (one) structure for the reactive intermediate that explains this fact.

9. Rank these in terms of acidity (1 = most acidic, 3 = least acidic)

cyclopentane, cyclopentadiene, cyclohepta-1,3,5-triene